UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,350	04/03/2006	Ludwig Schwoerer	006136.00015	2234

22907 7590 11/10/2009

BANNER & WITCOFF, LTD.
1100 13th STREET, N.W.
SUITE 1200
WASHINGTON, DC 20005-4051

EXAMINER	
ELLIOTT IV, BENJAMIN H	

ART UNIT	PAPER NUMBER
2474	

MAIL DATE	DELIVERY MODE
11/10/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,350	SCHWOERER, LUDWIG	
	Examiner	Art Unit	
	BENJAMIN ELLIOTT	2474	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 15-33* is/are rejected.

7)☒ Claim(s) *9-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-33 have been examined and are pending. In response to office action mailed 2/25/2009, Claims 1-33 have been amended, and Claim 34 has been canceled.

Response to Amendment

2. Rejection to Claims 25 and 33 under 35 U.S.C § 112, second paragraph has been withdrawn in light of amendments received in the Office on 6/25/2009.

3. Previous rejection to Claim 33 under 35 U.S.C. § 101 has been withdrawn in light of amendments received in the Office on 6/25/2009.

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the computer readable medium as disclosed in Claim 33 is not defined in the specification.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 33 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. As recited in Claim 33, the term "computer readable medium", as it is described in this form is unpatentable subject matter. Any claim referring to a signal or electronic waveform does not meet the requirements as set forth in 35 U.S.C. 101, and therefore are impermissible claims. Examiner could not find any evidence to the contrary within the specification that the computer readable medium may be defined as a signal and/or waveform (i.e., ***transitory medium***).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-8, 15-23, and 26-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,359,938 B1 to Keevill (hereinafter "Keevill") in view of US Patent Publication 2005/0174929 A1 to Hayashi (hereinafter "Hayashi").

Regarding Claim 1, Keevill in view of Hayashi discloses **an apparatus comprising:**

an apparatus configured to receive a multi-carrier transmission, wherein the multi-carrier transmission comprises various symbols, each symbol comprising a plurality of carriers (Keevill: Abstract; Col. 6, lines 39-43. An accumulation of phase errors is made between first and second symbols containing a plurality of carriers.), **an accessor configured to access at least one symbol which is configured to establish a distinguishable power based pattern for pilot carriers in the at least one symbol** (Keevill: Col. 8, lines 12-15. Pilot carriers are transmitted at a different power from data carriers. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.), **a block configured to establish power accumulation sums for possible pilot carriers of the symbol based on the pattern** (Keevill: Col. 8, lines 20-24. Magnitudes that correlate to powers of scattered pilot carriers are accumulated in accumulators. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.),

a block configured to determine a power accumulation sum maximum of the sums indicating a pilot carrier position (Keevill: Col. 8, lines 27-32. Accumulators add the absolute values of the powers and store the sums in

accumulators. Col. 8, lines 34-37. The identity of the accumulator containing the highest values of magnitudes correlating to powers of carriers is known. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.).

Keevill is silent on the pilot carrier symbols having a distinguishable power based pattern.

However, Hayashi teaches a method and receiving device wherein the channel response calculation section (Hayashi: Section 22, Figure 15) contains a differential power calculator (237) that outputs a power corresponding to a change amount in the channel responses for pilot signals in one cycle or N symbols (Hayashi: [0205-0206]). Figure 2 is an interpretation of the pattern of symbols (P1 = pilot symbols), generating a matrix with horizontal axis to the frequency, and the vertical axis to the time (Hayashi: [0084-0085]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill to include symbol patterns taught by Hayashi, to properly determine channel responses for data signals that existing between pilot signals in a pattern, wherein the response is based on the differences of power values (Hayashi: [0088], [0206]).

Further, Keevill discloses **the mobile terminal of Claim 29** (Keevill: Col. 1, lines 22-28), **the sub-assembly of Claim 30** (Keevill: Figures 10 and 11), **the chipset of Claim 31** (Keevill: Figure 12), **and the method of Claim 32** (Keevill: Col. 4, lines 29-32). Claims 29-32 correspond to claim 1. Therefore, claims 29-32 are rejected for the same reasons as set forth for claim 1 presented above. Please see examiner's comments with respect to claims 1 above.

Regarding Claim 2, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein one of the possible pilot carriers is configured to comprise the maximum in accordance with the predetermined pattern for the pilot carriers within the symbol** (Keevill: Col. 8, lines 27-32. Accumulators add the absolute values of the powers and store the sums in accumulators. Col. 8, lines 34-37. The identity of the accumulator containing the highest values of magnitudes correlating to powers of carriers is known.).

Keevill is silent on the pilot carrier symbols having a distinguishable power based pattern.

However, Hayashi teaches a method and receiving device wherein the channel response calculation section (Hayashi: Section 22, Figure 15) contains a differential power calculator (237) that outputs a power corresponding to a change amount in the channel responses for pilot signals in one cycle or N symbols (Hayashi: [0205-0206]). Figure 2 is an interpretation of the pattern of symbols (P1 = pilot symbols), generating a matrix with horizontal axis to the frequency, and the vertical axis to the time (Hayashi: [0084-0085]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill to include symbol patterns taught by Hayashi, to properly determine channel responses for data signals that existing between pilot signals in a pattern, wherein the response is based on the differences of power values ([0088], [0206]).

Regarding Claim 3, Keevill is silent on **an apparatus according to claim 1, wherein the position of the possible pilot carriers is configured to be based on the pattern in such a way that carrier indexes having a pilot in a matrix of certain number of symbols are configured to be selected, and the corresponding carrier index position within the accessed symbol is accordingly configured to be selected.**

However, Hayashi teaches, in Figure 2, an interpretation of the pattern of symbols (P1 = pilot symbols), generating a matrix with horizontal axis to the frequency, and the vertical axis to the time ([0084-0085]). The index in the carrier direction (along the frequency axis) is called a carrier index k, and the index in the symbol direction (along the time axis) is called a symbol index s. Channel responses are obtained based on these pilot signals.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill to include symbol patterns taught by Hayashi, to properly determine channel responses for data signals that existing between pilot signals in a pattern, wherein the response is based on the differences of power values ([0088], [0206]).

Regarding Claim 4, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein every predetermined carrier of the symbol is configured to be selected for the block configured to establish the power accumulation sums** (Keevill: Col. 5, lines 60-67; Col. 6, lines 1-9. An accumulation of sums is made based on the predetermined magnitude of the carriers, and a proper channel response is chosen.).

Regarding Claim 5, Keevill in view of Hayashi discloses **an apparatus according to claim 4, wherein every fourth carrier of the symbol is configured to be selected for the block configured to establish the power accumulation sums** (Keevill: Col. 35, lines 47-49. Phase differences of carriers are computed based on every fourth character.).

Regarding Claim 6, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein the distinguishable power based pattern comprises boosted pilot carriers compared to data carriers of the symbol** (Keevill: Col. 30, lines 32-34. The pilot carrier amplitudes are 4/3 that of data carrier amplitudes.).

Regarding Claim 7, Keevill in view of Hayashi discloses **an apparatus according to claim 6, wherein the pilots are boosted in amplitude of 4/3 compared to the data carriers** (Keevill: Col. 30, lines 32-34. The pilot carrier amplitudes are 4/3 that of data carrier amplitudes.).

Regarding Claim 8, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein the block configured to establish power accumulation sums further comprises:**
the a block configured to determining comprises:
a block configured to detecting the power accumulation maximum magnitude from the first, second, third, and fourth power accumulation sums for indicating the current scattered pilot raster position (Keevill: Col. 8, lines 27-32. Accumulators add the absolute values of the powers and store the sums in accumulators. Col. 8, lines 34-37. The identity of the accumulator

containing the highest values of magnitudes correlating to powers of carriers is known. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.).

Keevill is silent on **a block configured to perform a first power accumulation sum for first possible pilot carrier positions of the symbol, a block configured to perform a second power accumulation sum for second possible pilot carrier positions of the symbol, a block configured to perform performing a third power accumulation sum for third possible pilot carrier positions of the symbol, a block configured to performing a fourth power accumulation sum for fourth possible pilot carrier positions of the symbol.**

However, Hayashi teaches the four points are grouped into two, and linear operations are performed on the groupings representing channel responses for the one through four groupings of symbols (Hayashi: [0184]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill to include accumulating the sums of carrier symbols taught by Hayashi, to properly determine channel responses that are small in error from actual channel responses without increasing the circuit size (Hayashi: [0185]).

Regarding Claim 15, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein the accessor configured to access comprises:**

a block configured to obtain a first symbol of the transmission,

a block configured to obtain another symbol in relation to the first symbol (Keevill: Col. 6, lines 54-59. An accumulator is coupled to memory allowing phase differentials to be compared between a second symbol and a first symbol.).

Regarding Claim 16, Keevill in view of Hayashi discloses **an apparatus according to claim 15, wherein the accessed symbols comprise currently received symbol and certain predetermined another symbol preceding or following the currently received symbol** (Keevill: Col. 29, lines 17-22. Newly accumulated values of carriers are stored with known values. The carrier with the largest peak is the first active carrier in the symbol.).

Regarding Claim 17, Keevill in view of Hayashi discloses **an apparatus according to claim 15, wherein the accessed symbols comprise currently received symbol and certain predetermined another symbol preceding or following the currently received symbol** (Keevill: Col. 29, lines 17-22. Newly accumulated values of carriers are stored with known values. The carrier with the largest peak is the first active carrier in the symbol.).

Keevill is silent on **so that the correspondence pattern is configured to be established between pilot carriers of the symbols for possible carrier positions within the matrix of the symbols**.

However, Hayashi teaches, in Figure 2, an interpretation of the pattern of symbols (P1 = pilot symbols), generating a matrix with horizontal axis to the frequency, and the vertical axis to the time ([0084-0085]). The index in the carrier direction (along the frequency axis) is called a carrier index k, and the index in

the symbol direction (along the time axis) is called a symbol index s. Channel responses are obtained based on these pilot signals.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill to include symbol patterns taught by Hayashi, to properly determine channel responses for data signals that existing between pilot signals in a pattern, wherein the response is based on the differences of power values (Hayashi: [0088], [0206]).

Regarding Claim 18, Keevill in view of Hayashi discloses **an apparatus according to claim 15, wherein the certain predetermined another symbol comprises a consecutive symbol preceding or following the currently received symbol** (Keevill: Col. 8, lines 51-56. A mean phase difference is conducted between corresponding pilot symbols of successive symbols of the digital signal.).

Regarding Claim 19, Keevill in view of Hayashi discloses **an apparatus according to claim 15, wherein the block configured to establish power accumulation sums further comprises:**
a block configured to establish power accumulation sums for possible pilot carriers of the first symbol (Keevill: Col. 8, lines 20-24. Magnitudes that correlate to powers of scattered pilot carriers are accumulated in accumulators. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.), **and the apparatus further comprises:**
a block configured to establish another power accumulation sums for possible pilot carriers of the another symbol (Keevill: Col. 8, lines 34-41. A

second accumulator corresponding to a second carrier wherein sums are stored is compared to a first accumulator.),

and a block configured to establish cumulated power sums from the power accumulation sums and the another power accumulated sums (Keevill: Col. 8, lines 34-41. The receiver contains accumulators for storing sums.),

and the a block configured to determining the power accumulation sum maximum comprises:

a block configured to determining the power accumulation sum maximum of the cumulated power sums for indicating the current pilot carrier position (Keevill: Col. 8, lines 34-36. The accumulator storing the highest accumulated sums is identified.).

Regarding Claim 20, Keevill in view of Hayashi discloses **an apparatus according to claim 19, wherein the block configured to establish another power accumulation sums further comprises:**

a block configured to perform a first another power accumulation sum for first possible pilot carrier positions of the another symbol,

a block configured to perform a second another power accumulation sum for second possible pilot carrier positions of the another symbol,

a block configured to perform a third another power accumulation sum for third possible pilot carrier positions of the another symbol,

a block configured to perform a fourth another power accumulation sum for fourth possible pilot carrier positions of the another symbol (Keevill: Figure 43; Figure 48; Col. 35, lines 24-31 and lines 35-50. From Figure 43, the

accumulation block, 600, accumulates sums of the current symbol minus the symbol that preceded it by 4 (this correlates to a power accumulation sum of first, second, third, and fourth order). From Figure 48, a slope of best fit is determined from these accumulation sums every fourth symbol.).

Regarding Claim 21, Keevill in view of Hayashi discloses **an apparatus according to claim 19, wherein for the a block configured to establish cumulated power sums from the power accumulation sums and another power accumulation sums, the respective power accumulation sums of the first and the another symbol are configured to be selected in such a way that the pilot carriers of the symbols have a correspondence for the respective sums** (Keevill: Col. 8, lines 33-41 and lines 42-46. Sums are stored in accumulators. Intervals between first and second carriers are determined. Positions of the first and second carriers are then compared.).

Regarding Claim 22, Keevill in view of Hayashi discloses **an apparatus according to claim 20, wherein the block configured to establish cumulated power sums from the power accumulation sums and the another power accumulated sums comprises:**

a block configured to perform a first cumulated power sum for the first power accumulation sum of the first symbol and the fourth another power accumulation sum of the another symbol,

a block configured to perform a second cumulated power sum for the second power accumulation sum of the first symbol and the first another power accumulation sum of the another symbol,

a block configured to perform a third cumulated power sum for the third power accumulation sum of the first symbol and the second another power accumulation sum of the another symbol, and
a block configured to perform a fourth cumulated power sum for the fourth power accumulation sum of the first symbol and the third another power accumulation sum of the another symbol (Keevill: Figure 43; Figure 48; Col. 35, lines 24-31 and lines 35-50. From Figure 43, the accumulation block, 600, accumulates sums of the current symbol minus the symbol that preceded it by 4 (this correlates to a power accumulation sum of first, second, third, and fourth order). From Figure 48, a slope of best fit is determined from these accumulation sums every fourth symbol.).

Regarding Claim 23 Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein the multi-carrier transmission comprises OFDM transmission uses time-slicing** (Keevill: Col. 11, lines 21-23. A difference signal is found when two samples are sent separated by a time interval (time-sliced) equal to a fast Fourier transform that is applied.)**, the symbol comprises OFDM symbol** (Keevill: Col. 33, lines 58-61. The phase slope is determined from the phase difference of OFDM symbols.), **and the plurality of carriers comprise data carriers and scattered pilot carriers** (Keevill: Col. 6, lines 22-26. Channel estimation is performed using pilot carriers and data carriers.).

Regarding Claim 26, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein the apparatus further comprises:**

a Fast Fourier Transform (FFT) block configured to FFT transform the received transmission for obtaining the symbol (Keevill: Col. 11, lines 21-25. A difference signal is determined for samples separated by a period of time equal to the size of the fast Fourier transform applied.),
accumulator block configured to accumulating power accumulation sum results (Keevill: Col. 8, lines 20-24. Magnitudes that correlate to powers of scattered pilot carriers are accumulated in accumulators. Col. 4, lines 43-45. A digital receiver is used to receive the multi-carrier signals.),
and Channel Estimation block (CHE) for further continuing the reception of the transmission (Keevill: Col. 5, lines 60-61. The receiver provides for channel estimation and correction.).

Regarding Claim 27, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein computational resources for performing the operations of at least one of the means comprises the same computational resources which are configured to perform a post-FFT acquisition in the receiver** (Figure 14, Col. 18, lines 29-32. Acquisition and control of the FFT window is performed in block 166. FFT computations are performed in the FFT calculation circuitry block 168.).

Regarding Claim 28, Keevill in view of Hayashi discloses **an apparatus according to claim 1, wherein a buffer of the apparatus is configured to contain all said blocks** (Keevill: Col. 12, lines 18-21. Samples are buffered for an active interval in a memory.).

Regarding Claim 33, Keevill discloses **a computer readable medium comprising computer program code that when executed, causes a computer to perform the method of claim 32** (Keevill: Tables 4-39; Columns 38-59. Partial code is included as part of the application.).

9. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keevill and Hayashi as applied to claim 1 above, and further in view of US Patent 6,115,427 to Calderbank (hereinafter "Calderbank").

Regarding Claim 24, Keevill and Hayashi are silent on **an apparatus according to claim 1, wherein the multi-carrier transmission comprises time slicing based power saving based on bursts, and a synchronization of the apparatus into the bursts is configured to be based on the indicated pilot position for finding index of the received symbol.**

However, Calderbank teaches bursts are transmitted in time slots. Each burst stars with a synchronization sequence for timing and frequency. The transmitter adds a two-symbol pilot sequence to estimate the channel. The sequences are translated as orthogonal sequences. (Calderbank: Col. 17, lines 65-67; Col. 18, lines 1-11). The samples are correlated to pilot positions (Calderbank: Col. 18, lines 26-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill and Hayashi to include time-slicing bursts for indicated pilot positions as taught by Calderbank to minimize the overall system delay by avoiding the need to wait for future bursts in

order to estimate the channel, as only the pilot symbols per burst are used (Calderbank: Col. 18, lines 54-57).

Regarding Claim 25, Keevill is silent on **an apparatus according to claim 1, wherein the multi-carrier transmission comprises DVB transmission using time slicing based on bursts, and synchronization into the bursts is configured to be based on the indicated pilot position for finding an indication indicating the OFDM symbol.**

However, Hayashi teaches multi-carrier transmissions using DVB (Hayashi: [0042], [0224]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Keevill and Hayashi to include DVB transmission in the multi-carrier transmission to determine channel responses from known pilot signals (Hayashi: [0224]).

Keevill and Hayashi are silent on using time slicing using bursts to synchronize into the bursts an indication of an OFDM signal.

However, Calderbank teaches bursts are transmitted in time slots. Each burst stars with a synchronization sequence for timing and frequency. The transmitter adds a two-symbol pilot sequence to estimate the channel. The sequences are translated as orthogonal sequences. (Calderbank: Col. 17, lines 65-67; Col. 18, lines 1-11). The samples are correlated to pilot positions (Calderbank: Col. 18, lines 26-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Keevill and Hayashi to include

time-slicing bursts for indicated pilot positions as taught by Calderbank to minimize the overall system delay by avoiding the need to wait for future bursts in order to estimate the channel, as only the pilot symbols per burst are used (Calderbank: Col. 18, lines 54-57).

Allowable Subject Matter

10. Claims 9-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments filed 6/25/2009 have been fully considered but they are not persuasive. Examiner respectfully disagrees with Applicant's arguments with regards to Claim 1 as being patentable over US Patent 6,359,938 to Keevill (hereinafter "Keevill"), in view of US Patent Publication 2005/0174929 to Hayashi (hereinafter "Hayashi").

Applicant specifically argues the reference Hayashi fails to disclose "an accessor configured to access at least one symbol which is adapted to establish a distinguishable power based pattern for pilot carriers in the at least one symbol". Examiner cited Hayashi, paragraphs [0206-0207] to describe the limitation. In the paragraphs, the differential power calculator takes into consideration differential power responses corresponding to a change amount in the responses for pilot signals in one cycle (at least one symbol). The

embodiment averages the change amounts obtained for the pilot-inserted carriers and formulates fading information. Based on this information, the channel responses can be calculated to the degree of the fading (Hayashi: [0212]). Examiner has interpreted the above cited paragraphs to read on the "distinguishable power based pattern", as written in the claims, as the pattern of signals influencing described in Figure 2 and [0084-0086].

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BENJAMIN ELLIOTT whose telephone number is (571)270-7163. The examiner can normally be reached on Monday thru Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Aung Moe can be reached on (571)272-7314. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aung S. Moe/
Supervisory Patent Examiner, Art Unit 2474

BENJAMIN ELLIOTT
Examiner
Art Unit 2474